various localities in the Upper Greensand and Chalk of Europe, and also occurs at Kome.

The fossils collected by Mr. Richardson on Queen Charlotte's Island have been shown by Mr. Whiteaves to represent the very base of the Cretaceous series, and to include some forms that are rather Jurassic than Cretaceous. The plants of this group, though few and imperfect, seem to be chiefly Conifers, as in the oldest Cretaceous flora of Europe.

Our present knowledge of the age of the American Cretaceous flora may then be epitomised as follows:—

1. The oldest Cretaceous rocks known in North America, those of Queen Charlotte's Island, represent the Neocomian of Europe, and have so far furnished no Angiospermous plants.

2. The Shasta group of California, supposed to be the equivalent of the upper part of the Neocomian, has yielded no plants.

3. The coal-strata and plant-beds of Vancouver's Island, probably a little later than the Dakota group of the interior, contain many Angiosperms, and are of the age of the Gault or Upper Greensand. Lesquereux's identification of Vancouver's Island plants in the Laramie of Colorado and Eocene of Mississippi is evidently a mistake. There are no species common to these very distinct formations.

4. The Dakota group, the mechanical base of the Cretaceous series of the interior of the continent, which has yielded at least 100 distinct species of Angiospermous woody plants, is certainly older than the Chalk of the Old World.

5. The Raritan sands and Amboy clays of New Jersey, the lowest members of the Cretaceous on the Atlantic coast, contain a flora not less rich than that of the Dakota, with which it has a few species in common. This group of plants has not yet been described, but a large number of specimens are in my hands, from which drawings and descriptions are being made for the State of New Jersey. The flora is that of a temperate climate, consisting mainly of Angiosperms, but it also includes many beautiful Conifers.

6. The Colorado group, or great series of marine Cretaceous beds of the interior of the Continent, represents the strata known in the Old World as the Gray and White Chalk, and the Maestricht beds. Few plants have been obtained from this group in the United States, but I am informed by Dr. Dawson that an interesting collection of plants has been obtained from it on Peace River, in Canada. These will soon be described by him.

7. The Laramie group, or "Lignite series" of the central part of the continent, underlies unconformably the Coryphodon beds, the base of the Eocene, and is in my opinion the upper member of the Cretaceous system. Many of its plants have been described by Mr. Lesquereux in his "Tertiary Flora," but so far as my observation extends it contains no species identical with any found in unmistakable Tertiary rocks.

School of Mines, New York, May 20 J. S. NEWBERRY

GEORGE ROLLESTON, M.D., F.R.S.

PROF. ROLLESTON'S death, which took place at Oxford on June 16, and which we briefly announced in our last number, may well be called premature, as he was in the prime of life, and but a few months ago seemed to all, except a few closely observant intimate associates, still in the plenitude of his powers, and capable of much good work in time to come.

The son of a Yorkshire clergyman, he was born at Maltby on July 30, 1829, and had therefore not completed his fifty-second year. His early aptitude for classical studies, carried on under the instruction of his father, must have been most remarkable if, as has been stated in one of his biographies, he was able at the age of ten to read any passage of Homer at sight. He was not educated at one of the great public schools, but entered at Pembroke College, Oxford, took a First Class in Classics in 1850, and was elected a Fellow of his College in 1851. He then studied medicine at St. Bartholomew's Hospital, joined the staff of the British Civil Hospital at Smyrna during the latter part of the Crimean war, was appointed assistant-physician to the Children's Hospital in London, 1857, but took up his residence again at Oxford in the same year on receiving the appointment of Lee's Reader in Anatomy at Christ Church. In 1860 he was elected to the newly-founded Linacre Professorship of Anatomy and Physiology, which he held to the time of his death. He was elected a Fellow of the Royal Society in 1862, and a Fellow of Merton College, Oxford, in 1872. He was a member of the Council of the University, and its representative in the General Medical Council, and also an active member of the Oxford Local Board.

In 1861 he married Grace, daughter of Dr. John Davy, F.R.S., and niece of Sir Humphry Davy, and he leaves a family of seven children.

The duties of the Linacre professorship involved the teaching of a wide range of subjects included under the terms of physiology and anatomy, human and comparative, to which he added the hitherto neglected but important subject of anthropology, as well as the care of a great and ever-growing museum. In the present condition of scientific knowledge it requires a man of very versatile intellect and extensive powers of reading to maintain anything like an adequate acquaintance with the current literature of any one of these subjects, much more to undertake original observations on his own account. Even a man of Rolleston's powers felt the impossibility of any one person doing justice to the chair as thus constituted, and strongly urged the necessity of dividing it into three professorships, one of physiology, one of comparative anatomy, and one of human anatomy and anthropology. The work which he did however contrive to find time to publish, and by which he will be chiefly known to posterity, is remarkable for its thoroughness. He never committed himself to writing without having completely mastered everything that had been previously written upon the subject, and his memoirs bristle with quotations from, and references to, authors of all ages and all nations. The abundance with which these were supplied by his wonderful memory, and the readiness with which, both in speaking and writing, his thoughts clothed themselves with appropriate words, sometimes made it difficult for ordinary minds to follow the train of his argument through long and voluminous sentences, often made up of parenthesis within parenthesis.

The work which was most especially the outcome of his professorial duties is the "Forms of Animal Life," published at the Clarendon Press in 1870. Though written chiefly with a view to the needs of the university students, it is capable of application to more general purposes, and is one of the earliest and most complete examples of instruction by the study of a series of types, now becoming so general. As he says in the preface, "The distinctive character of the book consists in its attempting so to combine the concrete facts of zootomy with the outlines of systematic classification, as to enable the student to put them for himself into their natural relations of foundation and superstructure. The foundation may be wider, and the superstructure may have its outlines not only filled up, but even considerably altered by subsequent and more extensive labours; but the mutual relations of the one as foundation and the other as superstructure which this book particularly aims at illustrating, must always remain the same."

Besides this work, Prof. Rolleston's principal contributions to comparative anatomy and zoology are the following:—"On the Affinities of the Brain of the Orang Utang," *Nat. Hist. Review*, 1861; "On the Aquiferous and Oviductal System in the Lamellibranchiate Molluscs" (with Mr. C. Robertson), *Phil. Trans.* 1862; "On the Placental Structures of the Teurec (*Centetes ecaudatus*) and those of certain other Mammals, with Remarks on the Value of the Placental System of Classification," *Trans.* Zool. Soc. 1866; "On the Domestic Cats of Ancient and Modern Times" (*Journal of Anatomy*, 1868); "On the Homologies of Certain Muscles Connected with the Shoulder-Joint" (*Trans.* Linn. Soc., 1870); "On the Development of the Enamel in the

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Teeth of Mammals" (*Quart. Journ.* Micros. Soc., 1872); and "On the Domestic Pig in Prehistoric Times" (*Trans.* Linn. Soc., 1877).

Latterly he did much admirable work in anthropology, for which he was excellently qualified, being one of the few men who possess the culture of the antiquary, historian, and philologist on the one hand, and of the anatomist and zoologist on the other, and could make these different branches of knowledge converge upon the complex problems of man's early history. The chief results of his work of this nature are contained in his contribution to Greenwell's "British Barrows" (1877), a book containing a fund of solid information relating to the early inhabitants of this island. In this department of science Prof. Rolleston stood almost alone in this country, and we know of no more fitting tribute which the University of Oxford could pay to his memory than to found a chair of anthropology, a subject in the cultivation of which England is fast being outstripped by every other civilised nation. His last publication, and one which is on the whole the most characteristic as exhibiting his vast range of knowledge on many different subjects, was a lecture delivered in 1879 at the Royal Geographical Society on "The Modifications of the External Aspects of Organic Nature produced by Man's Interference."

That Dr. Rolleston has not left more original scientific work behind him is easily accounted for by the circumstances under which he lived at Oxford. The multifarious nature of the subjects with which the chair was overweighted; the perpetual discussions in which he was engaged consequent upon the transitional condition of education both at Oxford and elsewhere during the whole term of his office; the immense amount of business thrust upon him, or which he voluntarily undertook, of the kind that always accumulates round the few men who are at the same time capable and unselfish, such as questions pertaining to the local and especially the sanitary affairs of the town in which he lived, or connected with the reform of the medical profession, both in and out of the Medical Council, which constantly brought him to meetings in London; his own wide grasp of interest in social subjects, and deep feeling of the responsibilities of citizenship, and his sense of the duties of social hospitality, which made his house always open to scientific visitors to Oxford; all these rendered that intense concentration requisite for carrying out any continuous line of research impossible to him.

He was often blamed for undertaking so much and such diverse kinds of labour, so distracting to his scientific pursuits; but being by constitution a man who could never see a wrong without feeling a burning desire to set it right, who could never "pass by on the other side" when he felt that it was in his power to help, nothing but actual physical impossibility would restrain him. For several years past, when feeling that his health and strength did not respond to the strain he put upon them, he resorted to every hygienic measure suggested but one, and that the one he most required, rest; but this he never could or would take. During the last term he spent at Oxford, before his medical friends positively forced him (though unfortunately too late) to give up his occupations and seek change in a more genial climate, he was working at the highest pressure, rising every morning at six o'clock, to get two uninterrupted hours in which to write the revised edition of the "Forms of Animal Life" before the regular business of the day commenced.

It is impossible for those who had no personal knowledge of Rolleston to realise what sort of a man he was, and how great his loss will be to those who remain behind him. No one can ever have passed an hour in his company, or heard him speak at a public meeting, without feeling that he was a man of most unusual power, of lofty sentiments, generous impulses, marvellous energy, and wonderful command of language. In brilliant repartee, aptness of quotation, and ever-ready illustration from poetry, history, and the literature of many nations and many subjects, besides those with which he was especially occupied, he had few equals. "In God's war slackness is infamy" might well have been his motto, for with Rolleston there was no slackness in any cause which he believed to be God's war. He was impetuous, even vehement, in his advocacy of what appeared to him true and right, and unsparing in denunciation of all that was mean, base, or false. To those points in the faith of his fathers which he believed to be essential he held reverently and courageously, but on many questions, both social and political, he was a reformer of the most advanced type. Often original in his views, always outspoken in giving expression to them, he occasionally met with the fate of those who do not swim with the stream, and was misunderstood; but this was more than compensated for by the affection, admiration, and enthusiasm with which he was regarded by those who were capable of appreciating his nobility of character. The loss of the example afforded by such a nature, and of his elevating influence upon younger and weaker men, is to our mind a still greater loss, both within and without the University in which he taught, than the loss of what scientific work he might yet have performed.

Dr. Rolleston's personal appearance corresponded with his character. Of commanding height, broad-shouldered, with a head of unusual size, indicating a volume of brain commensurate with his intellectual power, and with strongly-marked and expressive features, in which refinement and vigour were singularly blended, in him we saw just such a man as was described by the public orator at the late Oxford Commemoration, in words with which we may conclude this notice—"Virum excultissimi ingenii, integritatis incorruptissimæ, veritatis amicum, et propugnatorem impavidum." W. H. F.

THE ZOOLOGICAL SOCIETY'S INSECTARIUM

IN our notice of this recent addition to the Regent's Park collection (*antea*, vol. xxiv. p. 38) we regret to find we have made an error in the name of the curator of the Insectarium. Mr. *William* Watkins (not *E.* Watkins as there given) has made many good additions to the collection of living insects under his charge since we last wrote, and attracts a host of visitors every day to inspect his living wonders. In a report on the Insectarium read at a recent scientific meeting of the Zoological Society by the secretary, Mr. Watkins gave the subjoined account of the progress of the development of the large moths of the family Bombycidæ during the month of May.

GLOVER'S SILK-MOTH (*Samia Gloveri*).—Specimens of this species emerged almost daily through the month, and fertile eggs were obtained, which hatched on the 12th instant. The larvæ when hatched are a shining black, with numerous spines of the same colour; after the first change, which took place in six days, they assume a yellowish colour; at the second moult they become green with paler coloured spines, each tipped with bright red. A choice of many shrubs were given them, but although they ate plum and sallow they left these for gooseberry.

CECROPIAN SILK-MOTH (*Samia Cecropia*).—This species emerged through the month, and copulation was frequent. A large number of eggs were obtained, but many are not fertile, perhaps owing to the stock already having been interbred. Young larvæ hatched on the 14th instant, and are growing well. Food-plant, plum.

AILANTHUS SILK-MOTH (*Attacus Cynthia*).—This species commenced to emerge towards the end of the month, but only four specimens have yet appeared. It is usually the latest species of all.

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